

Claims

This listing of claims replaces all previous versions of the claims:

1. (Currently Amended) A ~~multilayer~~ product made out of a substrate, and at each side of the substrate is at least one cover layer completely or partly covering the substrate, the substrate being a fibre reinforced thermoplastic product with randomly distributed fibres and with a density of less than 1.2 grams per cm³, preferably less than 1.0 grams per cm³, the at least one cover layer being a continuous fibre reinforced thermoplastic product that bonds at a thermoplastic material of the substrate to form a single consolidated product ~~ion~~ and in which the continuous fibres are orientated approximately parallel to one another.
2. (Previously Presented) Multilayer product of claim 1, wherein the fibres of the substrate have an average length of between about 7 and 200 millimetres.
3. (Previously Presented) Multilayer product of claim 1, wherein the at least one cover layer has continuous fibres with an average length of at least 100 millimetres.
4. (Previously Presented) Multilayer product of claim 1, wherein the at least one cover layer has continuous fibres each individually embedded in a thermoplastic material.
5. (Previously Presented) Multilayer product of claim 1 with the thermoplastic material of the substrate and a thermoplastic material of the cover layer are both selected from the group consisting of polyolefins, polycarbonates, vinyl aromatic homopolymers, vinyl aromatic

compounds containing copolymers, vinyl aromatic compounds containing graft copolymers or vinyl aromatic compounds containing blockcopolymers, thermoplastic polyesters, thermoplastic polyurethanes, polyetherimides, polyphenylene sulfide, polyphenylene ethers, polyamides and blends of thermoplastic materials comprising at least one of the mentioned thermoplastic materials.

6. (Previously Presented) Multilayer product of claim 1, wherein the substrate has a thickness of between 1.0 and 10.0 millimetres.

7. (Previously Presented) Multilayer product of claim 1, wherein the at least one cover layer has a thickness of between 0.1 and 5 millimetres.

8. (Previously Presented) Multilayer product of claim 1, wherein the thermoplastic material of the substrate and a thermoplastic material of the cover layer are compatible so as to bond together.

9. (Previously Presented) Multilayer product of claim 1, wherein at least one cover layer is at each side of the substrate, the fibres in the cover layer at one side of the substrate having a different orientation relative to fibres in the cover layer at the other side of the substrate.

10. (Previously Presented) Multilayer product of claim 1, wherein the fibres in the substrate have been selected out of the group consisting of: glass, carbon, synthetic materials, mineral and natural fibres.

11. (Previously Presented) Multilayer product of claim 1, wherein the fibres in both the substrate and the at least one cover layer have been selected out the group consisting of: glass, carbon, synthetic materials, mineral and natural fibres.

12. (Currently Amended) A process of manufacturing a ~~multilayer product~~ from multiple layers that are joined together to form one whole, comprising the steps of:

covering a substrate at each side at least partly with at least one cover layer, the substrate being a fibre reinforced thermoplastic product with randomly distributed fibres and with a density of less than 1.2 grams per cm³ , preferably less than 1.0 grams per cm³ and the cover layer being a continuous fibre reinforced thermoplastic with the fibres being orientated approximately parallel to one another within each layer; and

consolidating the fibre reinforced thermoplastic product of the substrate at the fibre reinforced thermoplastic product of the cover layer.

13. (Previously Presented) Process of claim 12, further comprising a step of heating the multilayer product covered with the at least one cover layer under pressure in a mould corresponding with a desired shape of the multilayer product at a temperature above a glass transition temperature of a thermoplastic material in the consolidated substrate.

14. (Previously Presented) Process of claim 13, further comprising the step of heating the consolidated substrate under pressure before applying the at least one cover layer.

15. (Currently Amended) A painted multilayer product made out of a substrate, and at each side of the substrate is at least one cover layer, the substrate being a fibre reinforced thermoplastic product with randomly distributed fibres and with a density less than 1.2 grams per cm³ , preferably less than 1.0 grams per cm³ and the at least one cover layer being a continuous fibre reinforced thermoplastic product with the fibres being orientated approximately parallel to one another within each layer, wherein at least side of the multilayer product includes at least one paint layer, and wherein the ~~fibre reinforced thermoplastic product of the substrate is consolidated to the fibre reinforced thermoplastic product of the~~ and the at the least one cover layer are consolidated to form generally a whole.

16. (Previously Presented) Painted multilayer product of claim 15, further including a primer layer between the at least one cover layer and the at least one paint layer.

17. (Currently Amended) A process for painting a multilayer product, comprising the steps of:

covering at least partly each side of a consolidated substrate that is a glass fibre reinforced thermoplastic product with randomly distributed fibres at each side at least partly with at least one cover layer, the consolidated substrate being a glass fibre reinforced thermoplastic product with randomly distributed fibres and the cover layer being that is a long fibre reinforced thermoplastic film with the fibres being orientated approximately parallel to one another;

bonding the fibre reinforced thermoplastic product of the consolidated substrate at the fibre reinforced thermoplastic film of the to the at least one cover layer oriented on each side such that the substrate and the bonded cover layers form a generally consolidated product;

providing a primer at a surface of the at least one cover layer to be painted; and

giving the surface of the cover layer to be painted a surface treatment followed by an application of at least one paint layer.

18. (Previously Presented) Multilayer product of claim 1, further comprising multiple cover layers and wherein the orientation of the continuous fibres in each adjacent cover layer is different so as to be considered isotropic;

wherein the fibre reinforced thermoplastic product includes glass fibres;

wherein the product has a coefficient of thermal expansion that is very low;

wherein the product is shaped by heating and pressing the product or vacuum consolidating it in a mould having a desired shape; and

wherein the product has low density, great stiffness, good surface quality and is ideally suited for use as a body panel for vehicles.

19. (Previously Presented) The process of claim 12, further comprising the steps of:

subjecting the substrate to a treatment under heat and pressure prior to the covering step;

applying multiple film layers with continuous fibres in an orientation such that each subsequent layer differs from the orientation of the previous layer and wherein this is at least one of a 0 degree lay-up, a 90 degree lay-up, a unidirectional isotropic lay-up, and a quasi isotropic lay-up;

heating the substrate and the film layers to assure good merging of the substrate and the layers; and

moulding the multilayer product into desired three dimensionally shaped forms by pressing or vacuum consolidating it in a properly shaped mould.

20. (Previously Presented) The process of claim 17, further comprising the steps of:

treating the product with an intermediate surface flame treatment;
selecting the substrate material and the cover layer material so that they are merged together upon subjecting them to pressure and elevated temperatures;
preventing distortions of the mulitlayer product by applying on each side of the substrate the same number of films and with a balanced orientation.